

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1-20 (cancelled)

1 Claim 21 (currently amended): A method for measuring talking  
2 quality of a telephone link in a telecommunications network,  
3 the method comprising the steps of:

4 combining an original talker speech signal  ~~$s(t)$~~  and  
5 a returned artifact signal  ~~$r(t)$~~ , which occurred in a  
6 return channel of the telephone link as a consequence of the  
7 transmission of the original talker speech signal in a  
8 forward channel of the telephone link, to yield a combined  
9 speech signal  ~~$s'(t)$~~ ; and

10 subjecting the combined speech signal with respect to  
11 the talker speech signal to an objective measurement  
12 technique for measuring perceptual quality of speech  
13 signals; and

14 producing an output signal  ~~$q(t)$~~  which represents an  
15 estimated value of the talking quality.

1 Claim 22 (previously presented): The method according to  
2 claim 21 wherein the combining step comprises the step of  
3 adding the returned signal and the talker speech signal in  
4 the electrical domain.

1 Claim 23 (previously presented): The method according to  
2 claim 22 wherein the adding step is preceded by the step of  
3 inverse filtering either the returned signal or the talker  
4 speech signal.

1 Claim 24 (previously presented): The method according to  
2 claim 22 wherein the returned signal is taken off from a  
3 two-wire part of the telephone link.

1 Claim 25 (previously presented): The method according to  
2 claim 22 wherein the returned signal is taken off from a  
3 four-wire part of the telephone link.

1 Claim 26 (currently amended): The method according to  
2 claim 21 wherein the combining step comprises the step of  
3 combining, in the acoustical domain, the returned signal and  
4 the talker speech signal.

1 Claim 27 (previously presented): The method according to  
2 claim 26 wherein the talker speech signal and the returned  
3 signal are combined by means of a microphone, which is  
4 additional to a microphone in a telephone set and located  
5 near an ear of a talking user of the telephone set.

1 Claim 28 (previously presented): The method according to  
2 claim 21 wherein the talker speech signal and the returned  
3 signal are taken off from the telephone link.

1 Claim 29 (previously presented): The method according to  
2 claim 28 wherein the output signal is fed to a control input  
3 of an echo-minimizing device included in the telephone link.

1 Claim 30 (previously presented): The method according to  
2 claim 29 wherein the output signal is fed to a monitoring  
3 system.

1 Claim 31 (previously presented): The method according to  
2 claim 21 wherein the talker speech signal, and either the  
3 combined signal or the returned signal is stored in a data  
4 base.

Claim 32 (cancelled)

1 Claim 33 (currently amended): The device according to  
2 claim ~~32~~41 wherein the signal combination means comprise a  
3 signal adder.

1 Claim 34 (currently amended): The device according to  
2 claim ~~32~~41 wherein the signal combination means comprise  
3 first and second signal inputs, which are coupled to the  
4 forward channel and the return channel of the telephone  
5 link, respectively ~~the first input port being coupled to the~~  
6 ~~forward channel and the second input port being coupled to~~  
7 ~~the signal output of the signal combination means.~~

1 Claim 35 (previously presented): The device according to  
2 claim 34 wherein the output port is coupled to a control  
3 input of an echo-minimizing device included in the telephone  
4 link.

1 Claim 36 (currently amended): The device according to  
2 claim ~~32~~41 wherein the first and the second input ports are  
3 coupled to a data base of speech signals, in which the first  
4 speech signal and either the second speech signal or the  
5 echo signal are stored.

1 Claim 37 (currently amended): A telephone-link circuit for a  
2 telephone link in a telecommunications network, wherein the  
3 telephone-link circuit has a forward channel and a return  
4 channel and an echo-minimizing device included between the  
5 forward channel and the return channel, the telephone-link  
6 circuit further comprising:

7 a signal combiner provided with first and second signal  
8 inputs, which are coupled to the forward channel and the  
9 return channel of the telephone link, respectively, and  
10 having a signal output which provides a combination of the  
11 first and second signals, wherein the forward channel  
12 provides an original talker speech signal and the return  
13 channel provides a returned artifact signal which occurred  
14 in the return channel of the telephone link as a consequence  
15 of transmission of the original talker speech signal in the  
16 forward channel; and

17 an objective measurement device, provided with a first  
18 input port coupled to the forward channel and a second input  
19 port, coupled to the signal output of the signal combiner,  
20 and an output port, for processing a first original speech  
21 signal received on the first input port with the signal

22 output from the signal combiner~~a second speech signal~~  
23 received on the second input port and for producing an  
24 output signal on the output port, the output signal  
25 representing an estimated value of taking quality of the  
26 telephone link.

1 Claim 38 (previously presented): The telephone-link circuit  
2 according to claim 37 wherein the output port of the  
3 measurement device has a signal coupling with a control  
4 input of the echo-minimizing device.

1 Claim 39 (previously presented): The telephone-link circuit  
2 according to claim 37 further comprising a detection device  
3 for detecting speech status over the telephone link, and a  
4 switch included in the signal coupling with the control  
5 input, the switch being controlled by the detection device.

1 Claim 40 (previously presented): The telephone-link circuit  
2 according to claim 37 wherein the output port of the  
3 measurement device has a signal coupling with a monitoring  
4 system.

1 Claim 41 (new): A device for measuring talking quality of a  
2 telephone link in a telecommunications network, the device  
3 comprising measuring means for objectively measuring  
4 perceptual quality of speech signals, the device comprising:  
5 the measuring means having:

6 a first input port for receiving a first speech  
7 signal transmitted or to be transmitted via a forward  
8 channel of the telephone link;

9           a second input port for receiving a second speech  
10 signal, which is a function of the first speech signal  
11 affected in the telecommunications network;

12           an output port for providing an output signal  
13 representing an estimated value of the perceptual quality of  
14 the second speech signal with respect to the first speech  
15 signal; and

16           signal combination means for combining the first speech  
17 signal and a third speech signal so as to generate the  
18 second speech signal, the first and third speech signals  
19 being, respectively, an original talker speech signal and a  
20 returned artifact signal, the returned artifact signal  
21 occurring in a return channel of the telephone link as a  
22 consequence of transmission of the original talker speech  
23 signal in a forward channel of the telephone link, the  
24 output signal being an estimated value of the talking  
25 quality.

1       Claim 42 (new): A method for measuring talking quality of a  
2 telephone link in a telecommunications network, the method  
3 comprising the steps of:

4           combining an original talker speech signal and a  
5 returned artifact signal to yield a combined speech signal,  
6 the returned artifact signal having occurred in a return  
7 channel of the telephone link as a consequence of  
8 transmission of the original talker speech signal in a  
9 forward channel of the telephone link; and

10          subjecting the combined speech signal with respect to  
11 the original talker speech signal to an objective  
12 measurement technique for measuring perceptual quality of  
13 speech signals; and

14       producing an output signal which represents an  
15       estimated value of the talking quality and feeding the  
16       output signal as a control input to an echo-minimizing  
17       device included in the telephone link.

1       Claim 43 (new): The method according to claim 42 wherein the  
2       combining step comprises the step of adding the returned  
3       signal and the original talker speech signal in the  
4       electrical domain.

1       Claim 44 (new): The method according to claim 43 wherein the  
2       adding step is preceded by the step of inverse filtering  
3       either the returned signal or the original talker speech  
4       signal.

1       Claim 45 (new): The method according to claim 43 wherein the  
2       returned signal is taken off from a two-wire part of the  
3       telephone link.

1       Claim 46 (new): The method according to claim 43 wherein the  
2       returned signal is taken off from a four-wire part of the  
3       telephone link.

1       Claim 47 (new): The method according to claim 42 wherein the  
2       combining step comprises the step of combining, in the  
3       acoustical domain, the returned signal and the original  
4       talker speech signal.

1       Claim 48 (new): The method according to claim 47 wherein the  
2       original talker speech signal and the returned signal are  
3       combined by means of a microphone, which is additional to a

4 microphone in a telephone set and located near an ear of a  
5 talking user of the telephone set.

1 Claim 49 (new): The method according to claim 42 wherein the  
2 original talker speech signal and the returned signal are  
3 taken off from the telephone link.

1 Claim 50 (new): A device for measuring talking quality of a  
2 telephone link in a telecommunications network, the device  
3 comprising measuring means for objectively measuring  
4 perceptual quality of speech signals, the device comprising:  
5 the measuring means having:

6 a first input port for receiving a first speech  
7 signal transmitted or to be transmitted via a forward  
8 channel of the telephone link;

9 a second input port for receiving a second speech  
10 signal which is a function of the first speech signal  
11 affected in the telecommunications network;

12 an output port for providing an output signal  
13 representing an estimated value of the perceptual quality of  
14 the second speech signal with respect to the first speech  
15 signal; and

16 signal combination means for combining the first speech  
17 signal and a third speech signal so as to generate the  
18 second speech signal, the first and third speech signals  
19 being, respectively, an original talker speech signal and a  
20 returned artifact signal, the returned artifact signal  
21 occurring in a return channel of the telephone link as a  
22 consequence of transmission of the original talker speech  
23 signal in a forward channel of the telephone link, and the



24 output signal representing an estimated value of the talking  
25 quality, and

26 wherein the output signal is applied to a control input  
27 of an echo-minimizing device included in the telephone link.

1 Claim 51 (new): The device according to claim 50 wherein the  
2 signal combination means comprise a signal adder.

1 Claim 52 (new): The device according to claim 50 wherein the  
2 signal combination means comprise first and second signal  
3 inputs which are coupled to the forward channel and the  
4 return channel of the telephone link, respectively.

1 Claim 53 (new): The device according to claim 50 wherein the  
2 first and the second input ports are communicatively coupled  
3 to a data base of speech signals in which the first speech  
4 signal and either the second speech signal or the echo  
5 signal are stored.

1 Claim 54 (new): A telephone-link circuit for a telephone  
2 link in a telecommunications network, wherein the  
3 telephone-link circuit has a forward channel and a return  
4 channel and an echo-minimizing device included between the  
5 forward channel and the return channel, the telephone-link  
6 circuit further comprising:  
7 a signal combiner provided with first and second signal  
8 inputs, which are coupled to the forward channel and the  
9 return channel of the telephone link, respectively, and  
10 having a signal output, wherein the forward channel provides  
11 an original talker speech signal and the return channel  
12 provides a returned artifact signal which occurs in the

13 return channel of the telephone link as a consequence of  
14 transmission of the original talker speech signal in the  
15 forward channel;

16 an objective measurement device, provided with a first  
17 input port coupled to the forward channel and a second input  
18 port coupled to the output of the signal combiner and an  
19 output port, for processing the original talker speech  
20 signal received on the first input port with a second speech  
21 signal received on the second input port and for producing  
22 an output signal on the output port, said output signal  
23 representing an estimated value of the talking quality; and

24 the output signal being applied to a control input of  
25 the echo-minimizing device.

1 Claim 55 (new): The telephone-link circuit according to  
2 claim 54 further comprising a detection device, for  
3 detecting speech status over the telephone link, and a  
4 switch included in a signal coupling with the control input,  
5 the switch being controlled by the detection device.